IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

In re: REMBRANDT TECHNOLOGIES, LP PATENT LITIGATION	**MDL Docket No. 07-md-1848 (GMS)**
	JURY TRIAL DEMANDED

REMBRANDT TECHNOLOGIES, LP'S
RESPONSIVE CLAIM CONSTRUCTION BRIEF ON THE "EIGHT PATENTS"

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'234	U.S. Patent No. 5,778,234
'444	U.S. Patent No. 6,950,444
'631	U.S. Patent No. 5,852,631
'761	U.S. Patent No. 5,710,761
'819	U.S. Patent No. 4,937,819
'858	U.S. Patent No. 5,719,858
'903	U.S. Patent No. 5,008,903
DFT	Discrete Fourier Transform
DSL	Digital Subscriber Line
EP	Essential Programs
NAU	Network Access Unit
OSI	Open Systems Interconnect
PSTN	Public Switched Telephone Network
PTO	United States Patent & Trademark Office
RAM	Random Access Memory
SNR	Signal-to-Noise Ratio
TDM	Time-Division Multiplexed

I. INTRODUCTION AND LEGAL STANDARDS

The patents-in-suit claim inventions related to establishment of data communications, improved data transmission, and remote updates of software. These inventions are not restricted to any particular transmission medium – Defendants' argument that any of the inventions are limited to telephony or DSL technology has no support in the patents – and they plainly apply to transmission of data over cable systems. Many of these patents are widely cited in patents that cover a broad array of technology. The Court should reject Defendants' repeated attempts to confine the patents to particular applications when the claims are not so limited.

Defendants seek construction of an enormous number of terms, imposing a needless burden on the Court. Defendants' constructions are unsupported, confusing, and unhelpful. The overwhelming majority of the terms require no construction, but by proposing a construction – no matter how strained – Defendants place a burden on Rembrandt to respond and on the Court to resolve the dispute. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361-63 (Fed. Cir. 2008).[1] Not counting means-plus-function claims, only 30 terms are agreed to need construction. Yet Defendants seek construction of dozens more.

The number of terms before the Court has nothing to do with how many claims Rembrandt has asserted. Just a handful of claims account for nearly all of the disputed terms. Rembrandt asserted the same claims of three patents-in-suit (the '631, '819, and '858) in a prior phase of this litigation. Then, only 26 terms were contested; now, with the same claims asserted,

[1] Defendants characterize a number of Rembrandt's constructions as "belated" and request that they be precluded. Def. Br. 1 n.1. Rembrandt's constructions were not belated. Rembrandt believes that the majority of the terms should be given their ordinary meaning, and did not (and does not) believe that the vast majority of the terms identified by Defendants warrant construction, but nevertheless provided constructions after identifying which of Defendants' constructions were in dispute. Given that Defendants have responded to Rembrandt's constructions in their opening brief, the constructions cannot be characterized as belated.

69 terms are contested. This avalanche of terms arises from Defendants' decision to seek unreasonable limiting constructions no matter how clear the term or how strained the argument. Whereas Rembrandt seeks to focus the issues presented, Defendants attempt to overwhelm the Court with inaccurate information, unnecessary proposals, and tenuous arguments.

To justify their proposed constructions, Defendants provide misleading descriptions of the patents' inventions, ignore claim language, disregard canons of claim construction, and misread the specifications and file history. The Court should reject such efforts. "It is a 'bedrock principle' of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "'[I]f we once begin to include elements not mentioned in the claim, in order to limit such claim . . . , we should never know where to stop.'" *Id.* (quoting *McCarty v. Lehigh Valley R.R.*, 160 U.S. 110, 116 (1895)) (ellipsis in original). In construing technical terms in the claims, "[t]he best source . . . is the specification from which it arose, informed, as needed, by the prosecution history." *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998). But it is one thing to use the specification and file history in aid of construction and another to seek to narrow the claims of a patent by importing limitations from the specification – which is not permitted. *See Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1316 (Fed. Cir. 2007); *Creo Prods., Inc. v. Presstek, Inc.*, 166 F. Supp. 2d 944, 964 (D. Del. 2001) ("When the court looks to patent specifications to assist in interpreting claims, it must refrain from reading a limitation from the written description into the claim.").

Defendants ignore these "bedrock principle[s]" and – over and over again – seek to import details from the preferred embodiment into the claims as new limitations. Or they simply make up limitations from whole cloth. The Court should reject their attempts and give the claim

terms their "ordinary and customary meaning," without additional limitations. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996).

II. THE '631 AND '761 PATENTS

These two related patents address improving efficiency when establishing communication between modems.[2] The word modem stands for modulator-demodulator and signifies that these devices convert (or "modulate") digital data into signals sent across a transmission medium (such as a cable, optical fiber, or telephone wire). Modems communicate using a variety of protocols arranged in a so-called stack containing various layers – the bottom layer of the stack is the physical layer and the next layer up is the link layer. When two modems connect, they often have to negotiate with one another in order to agree on which protocols to use at each layer and what settings to use in those protocols. This negotiation process takes time. Some link layer protocols may work more efficiently with certain physical layer protocols than with others. Consequently, the inventor realized, taking information about the physical layer into account when selecting parameters for the link layer can improve efficiency. The patents take advantage of this insight to reduce the number of steps necessary to establish the physical and link layer connections, thereby streamlining the connection process. The appropriate protocols and parameters for the link layer are selected based on negotiated physical layer properties.

A. Defendants Erroneously Treat Particular Aspects of Preferred Embodiments As Claim Limitations

Defendants repeatedly invite the Court to commit error by treating various aspects of the preferred embodiments as if they were claim limitations. Most prominently, Defendants propose constructions that would restrict these two patents to telephone modems and telephone protocols

[2] The '631 and '761 patents have the same inventor, and the '631 patent is subject to a terminal disclaimer under which it will expire on the same day as the '761 patent.

existing at the time the patent applications were filed. But Defendants do not stop there. They continue to pile on more aspects of the particular embodiments as if they were claim limitations.

For example, Defendants' construction of "establishing a link layer connection between a calling modem . . . and an answering modem" ('631 #4) is replete with extraneous limitations (indicated in italics): "connection that is established *after establishing the physical layer connection, without transferring data bytes* by using *telephone network link layer standards (i.e., V.42, V.42bis or MNP).*" As shown below, none of these extra limitations is justified.

1. The '631 and '761 Patents Are Not Limited to Telephone Modems

The patents refer to certain telephone equipment and protocols existing at the time the applications were filed to describe exemplary embodiments and to illustrate how those inventions improved upon the prior art (including the prior art protocols mentioned in the patent). The disclosed embodiments, however, are "merely illustrative of a system that can benefit from the present invention." '631, 4:9-12.[3] And the patents make clear that the written description "is not to be taken in a limiting sense, but is made merely for the purpose of describing the general principles of the invention." '631, 4:1-3. The patents also prominently reference the OSI and TCP/IP protocol stacks ('631, 1:34-47), which facilitate communication between two devices *over any kind of data network*. *See, e.g.,* R142-43 ¶ 26.

The claims at issue in the '631 and '761 patents deal generally with "data communications equipment" and "modems." The claims are not limited to telephone modems or particular telephone standards because the invention is not about telephony, but rather about streamlining negotiations about physical and link layer connections in data communications. Persons skilled in the art have *not* understood these patents as being limited to telephone

[3] Citation to, for example, '631, 4:9-12 indicates line and column numbers (here, column 4, lines 9-12) for the particular patent being discussed, each of which is included in the Joint Appendix.

modems, as evidenced by the multiple citations to the '631 and '761 patents in other patents involving broadband DSL, wireless communication networks, and distributed computer networks by such companies as IBM, Cisco, 3Com, Conexant, Agere, as well as the federal government. *See, e.g.*, U.S. Patent Nos. 6,823,017; 7,076,556; 6,693,998; 6,571,103; 6,076,174.

In claiming his invention in the '631 patent, the inventor described the two devices on either end of a connection as a "calling" modem and an "answering" modem, to distinguish between the two devices. Although no construction is necessary for these straightforward terms, Defendants propose to lard up the definition of "answering modem" with unjustified limitations (indicated in italics): "modem *operable with ITU V. standards* that answers *a call placed over a telephone network (i.e. cellular or PSTN)* by the calling modem." '631 #2. Defendants propose an analogous definition for "calling modem." '631 #1. The meaning of "modem," and the applicability of the invention, survives regardless of whether the connection is by telephone line, cellular network, coaxial cable, optical fiber, or wireless radio. Nothing in the patent teaches that the invention can be used only with telephone modems. Yet Defendants seek to impose similar limitations throughout these patents. '631 #1, #2, #4, #7, #8, #10, #13; '761 #1, #4.

Defendants provide no legitimate reason to read these limitations into such simple terms. Indeed, their only purported support consists of citations to embodiments showing that the invention *can* be used with modems communicating over a telephone line. But the law is clear that the claims should *not* be limited by the embodiment(s) used to describe them or by language of convenience used to denote and distinguish terms in the claims.[4]

[4] *See Phillips*, 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments."); *Creo Prods.*, 166 F. Supp. 2d at 965 ("This argument . . . falls into the trap of redefining the stated function of the claim element in light of the preferred embodiment."); *see also Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1302-03 (Fed. Cir. 2007)

2. The Patents Are Not Limited to Error Control Protocols That Existed at the Time They Were Filed

Defendants wrongly argue that the '761 claims should be restricted, in general, to "1995" telephone standards, and, in particular, to the specific protocols listed by name in the specification. '761 #1, #4. In the first office action in the '761 prosecution (F000280), the Examiner objected to the specification because it did not include dates for the various protocols discussed therein. According to the Examiner, "[a] date is important since protocols and standards may change over time." F000282. Significantly, the Examiner *did not* reject the application under 35 U.S.C. § 112, ¶ 1, which he could have done if the description was lacking or not enabled. And he allowed some claims at the same time he objected to the specification, which indicates that he considered at least those claims to be fully enabled and adequately described without any particular date. The Examiner apparently asked for dates for the protocols so that the description would be considered sufficiently "exact," as required by PTO Rule 1.71.[5]

The applicant responded by identifying the applicable date as "the filing date of the present application." F000307. But the applicant specifically noted that "the present invention is applicable to all versions of the cited protocols and standards." *Id.* By saying that the Examiner could look to the then-current version of the protocols, the applicant did not suggest that the invention was limited to use *only* with those protocols. Defendants, however, seek to treat the applicant's statement as limiting the patents to only then-current versions of the particular protocols listed. Supplying a date at the Examiner's request cannot reasonably be construed as a

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(that specification had examples of translation from higher level to lower level did not support importing the high-to-low limitation into claims).

[5] In order to overcome this objection, the applicant could hardly have referred the Examiner to *future* protocols, because those, by definition, did not yet exist and hence would not provide the desired exactness for the specification. But the claims can and do cover whatever versions of whatever protocol may be used in satisfying them.

disclaimer of coverage after that date, especially when accompanied by an explicit statement that the invention applies to "all versions" of the protocols.[6] *See Elbex Video, Ltd. v. Sensormatic Elecs. Corp.*, 508 F.3d 1366, 1371 (Fed. Cir. 2007) (doctrine of prosecution history disclaimer "does not apply where the alleged disavowal is ambiguous; the disavowal must be both clear and unmistakable to one of ordinary skill in the art") (internal quotation marks omitted). Nor can the use of certain protocols in the preferred embodiments reasonably be interpreted as limiting the patent's coverage to only those protocols. *See* note 4, *supra*.[7]

3. The Physical and Link Layers Need Not Be Established Without "Data Bytes"

Defendants propose that modem connections must be established "without transferring data bytes" ('631 #4; *see also* #8, #12). Nothing in the claim language supports Defendants' extraneous limitation.[8] In support of their position, Defendants note that a preferred embodiment accomplishes part of the negotiation through the exchange of tones. *See* Def. Br. 5. If by "data bytes" Defendants mean *any* bytes of data, then their proposal is nonsensical, not only because

[6] Moreover, nothing requires the modulation to conform to some *standard* that is accepted across an industry. An equipment maker could adopt a non-standard modulation protocol and still use the invention to speed up the connection process. The patent mentions such a proprietary protocol, known as "ETC2-QC™." '631, 2:33-39. Defendants also seek to limit the standards to those that govern "only" physical layer connections without providing any reason why a standard that covered other topics ought not be included.

[7] Additionally, when the inventor intended to limit the claims to particular error control protocols and/or versions, he specifically did so (as in dependent claims 4, 5, 7, 8, 12, 13, 15, and 16). The independent claims and other claims, by contrast, are not specific about any particular error control protocol and/or versions. Under the doctrine of claim differentiation, limitations from the dependent claims should not be read into the claims from which they depend.

[8] Likewise, Defendants' effort to add the limitation that the physical layer connection parameters be "preset" in the modem ('631 #9, #12) finds no support in the claims.

exchanging tones is one way of transferring information but also because it would be impossible to establish any connection without exchanging data of some sort.[9]

Defendants misleadingly quote from the file history discussion of the McGlynn patent (U.S. Patent No. 4,905,282 (R326-340)). Def. Br. 5. During prosecution of the '631 patent, the applicant pointed out that "*McGlynn* fails to suggest and teaches away from establishing a physical layer connection and a link layer connection based upon a negotiated physical layer modulation." F000205. Instead (among other grounds for distinguishing the reference), "*McGlynn* teaches the negotiation for features *after* a physical layer modulation and a link layer connection have already been established." F000205-06 (second emphasis added). The applicant noted McGlynn's reference to data bytes as evidence of this, because, in McGlynn's system, "the use of data byte transfer suggests that the physical layer and link layer should be already established." F000208. The "features" being negotiated in McGlynn were being negotiated at layers higher than the physical and link layers in the protocol stack; accordingly, McGlynn did not teach establishing a link layer connection based upon a negotiated physical layer modulation. In short, the applicant distinguished McGlynn not because it used data bytes for negotiation, but because it used data bytes to negotiate something other than the physical and link layers.

4. Defendants Improperly Restrict the Ordering of Steps

Defendants would require that the physical layer be negotiated and established before the link layer is established. The '631 patent makes clear, however, that, "the steps for establishing

[9] A more plausible construction is that "data bytes" refers to bytes layers of the protocol stack *above* the physical and link layers. If construed in this way, Defendants' extra limitation is innocuous but also superfluous, because data bytes would never be used in establishing the physical and link layers. This more reasonable construction of "data bytes" is fully consistent with the prosecution history discussed in the next paragraph.

an error-correcting protocol are eliminated and the link layer connection is established *substantially instantaneously* upon the completion of the physical layer *negotiation*." 11:38-45 (emphasis added). Similarly, in Figure 4 of the '631 patent, if certain conditions are met (7:43-51), then *during* negotiation of the physical layer parameters the calling modem can, "in accordance with the present invention, set the error-correction parameters to preset values so as to avoid the necessity of negotiating the parameters." *Id.*[10] The strict ordering of physical layer negotiation and establishment of the physical layer before link layer establishment, as insisted by Defendants, reflects, if anything, the prior art rather than the '631 patent, in which the physical and link layers can be determined simultaneously rather than sequentially.[11]

For the '761 patent, Defendants further wrongly argue that *selection* of an error control negotiation sequence must "occur[] after the physical layer standard is selected and used to determine the physical layer parameters." Def. Br. 9; *see* '761 #2 (adding "before" limitation), #5 (adding "after" limitation), #7 (same). Citing '761, 2:13-20, Defendants state that "the physical layer is *always* negotiated 'before' the link layer." Def. Br. 9. Even if this were true, it would deal only with the *negotiation*, not the *selection*, of the error control negotiation sequence (which could happen before the physical layer negotiation is complete).[12]

[10] In Figure 4, the link layer parameters are set *before* step 64 (modem startup and training), *i.e.*, *before* the physical layer has been established. In fact, the link layer parameters may be known before step 61 (7:63-65) or before step 62 (7:49-51).

[11] This is also shown in Figure 8 of the '631 patent, which compares sequential connection without the '631 invention (top sequence 102), and then with the simultaneous connection of the '631 invention (bottom sequence 104). *See* 13:23-41.

[12] The only other portion of the '761 patent relied on by Defendants is an exemplary implementation, which should not be used to limit the scope of the claims. *See* 3:36 ("FIG. 2, an illustrative method"). *See* cases cited note 4, *supra*.

B. '761: Not All Error Control Protocols Need Be Tried, Let Alone "In Turn"

The '761 patent describes various problems with the prior ways of negotiating error control. *See* 1:20-58. Defendants cite, and *partially* quote from, the background section that lists problems the inventor was trying to overcome. *See* Def. Br. 8 ("This comes right from the patent, which explains that 'a modem tries each type of error control protocol in turn.' ") (quoting 1:20-26). What the patent actually states is: "*Typically*, in negotiating the type of error control protocol a modem tries each type of error control protocol in turn." 1:20-22. Defendants' omission of "typically" wrongly implies that trying each protocol "in turn" is the only option. Indeed, Defendants fail to disclose not only that the quote comes from the background section, but also that it describes the typical modem then in existence, not the invention.

Defendants' arguments about trying the sequence "in turn" obscures another issue – that the claims do not all require the elements of the sequence to be tried at all. Claim 1 of the '761 patent has two steps, namely, "negotiating a physical layer" and a "selecting" step. Claim 2 (which depends from claim 1) adds the step of "negotiating error control." By the doctrine of claim differentiation, the limitations of claim 2 should give it a different scope from claim 1. *See Ecolab Inc. v. Paraclipse, Inc.*, 285 F.3d 1362, 1375 (Fed. Cir. 2002) ("Under the doctrine of claim differentiation, each claim in a patent is presumptively different in scope.") (internal quotation marks omitted); *Dow Chem. Co. v. United States*, 226 F.3d 1334, 1341-42 (Fed. Cir. 2000). Similar arguments apply to claim 9 (which requires no negotiation of the error control) and claim 10 (which "negotiates error control"). In neither case do Defendants point to intrinsic evidence or other facts that could overcome the strong presumption that a dependent claim is narrower in scope than the claim from which it depends.

C. The Link Layer Does Not Require Retransmission of Frames

Defendants construe "link layer" to require that the link layer retransmit frames that are not received correctly. '631 #3. Their sole support is a statement in the background section of the '631 patent noting that the link layer "is provided to perform error checking functions as well as retransmitting frames that are not received correctly." '631, 1:51-54. Some error control mechanisms may require retransmission of frames, and the link layer is provided, in part, to accommodate such retransmission *when it is needed* by the chosen error control mechanism. But other so-called "forward error control" mechanisms do not retransmit frames; instead, they use special encoding that can be used to reconstitute corrupted frames on the receiving end without retransmission. Nothing in the intrinsic evidence limits the patents to any particular form of error control. Defendants' attempt to alter the scope of the claims so that they will not cover systems that use forward error correction should be rejected.

D. Defendants' Means-Plus-Function Constructions Should Be Rejected

Defendants assert that certain selected claim elements are written in means-plus-function format, are subject to 35 U.S.C. § 112, ¶ 6, and can be met only by the structures identified in the specification or their equivalents. But Defendants seek such treatment for claim elements that are not in means-plus-function format – chiefly, elements calling for "logic for" performing certain tasks. And for those few claim elements that are actually subject to § 112, ¶ 6, Defendants have an improperly narrow reading of both the function and the corresponding structure.

1. "Logic for" Claim Elements Are Not in Means-Plus-Function Format

Claim 10 of the '631 patent recites a "computer program product having a computer readable medium including computer program logic recorded thereon for" performing various acts. Defendants assert that "'Logic for' lacks structure and is subject to 112, ¶ 6." Def. Br. 6.

The law is to the contrary: claims not using the phrase "means for" are presumed *not* to be subject to § 112, ¶ 6. *See Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1257 (Fed. Cir. 1999). Defendants have done nothing to overcome this presumption, and there is thus no basis to write various aspects of the preferred embodiments into the claims. Defendants ignore the structure present in the claim language describing computer program logic establishing a type of connection "based on" other information. R147 ¶¶ 35-36.

Rembrandt construes the term "computer program logic" to be "programming" – a meaning consistent with the way that term is ordinarily understood and consistent with the way that term was understood by the PTO ("to implement the method in software ('logic')"). F000217.

2. When Claims Are in Means-Plus-Function Format, Defendants Add Unwarranted Material to Functions and Corresponding Structures

Where a claim element is written in means-plus-function language, Defendants still overreach. For instance, the function associated with a "means for establishing said link layer connection based upon said negotiated physical layer modulation" ('631 claim 6) is establishing a link layer connection based upon a negotiated physical layer modulation, and thus the term should not require construction by the Court. Yet Defendants propose unwarranted limitations and imprecise words (indicated in italics): "link layer parameters in the calling and answering modems *default*, based on which physical layer modulation was *chosen* in the negotiation, *to values that were preset in each modem before the modems communicated*." '631 #13. None of these extra limitations is present in the claim language. Defendants give no justification for their departures from the language the claims use to describe each function. Defendants also distort the corresponding structures by, for example, importing unnecessary telephony limitations. *See*,

e.g., '631 #10 (requiring modem to be a "PSTN or cellular modem" listening to "tones"), #13 (same). These limitations are inappropriate and unsupported by the intrinsic evidence.

III. THE '444 PATENT

A modem waiting for a message may have to monitor a channel for the start of that message. This means the modem must "listen to" all incoming signals on the channel, including "silence" (periods of no transmission, where the only "signal" may be a carrier wave and noise). If the modem cannot distinguish silence from an actual signal, then it must try to process whatever it receives. The '444 patent teaches and claims improvements in distinguishing transmissions from "silence," using a preamble that signals the start of a message and delimits the message from silence. One reason for the invention's effectiveness is that the preamble is transmitted more clearly – "encoded at a lower bit per symbol rate" ('444 claim 1) than the rest of the message. A message (preamble) may be further distinguished from silence by making the beginning more noticeable – that is, "increasing the energy of the first symbol index" ('444 claim 24). These two techniques can be used together or separately. In claim 2, for example, the patent claims the first technique without mentioning the second technique. In dependent claim 3, the patent then claims both techniques in combination, specifically adding an "element configured to increase the energy of the first symbol index."

A. The "Preamble" Does Not Require That the First Symbol Be Transmitted at an Increased Energy Level

Defendants read all claims, even claim 1, as requiring the second technique (increasing the energy of the first symbol index) in addition to the first (encoding at a lower bit-per-symbol rate). Defendants construe "preamble" to require that "the preamble include[ ] a first symbol transmitted at a power level higher than all other preamble symbols." '444 #1. Their argument (at 24-25) – which consists solely of citations to the specification indicating that "the first

symbol 55 representing the first bits in the preamble 40 *can be* sent using an increased power level" (*e.g.*, 7:49-51) (emphasis added) – ignores both the claim language and the requirement of claim differentiation. *Ecolab*, 285 F.3d at 1375. Indeed, the presumption of claim differentiation is "especially strong where," as here, "there is a dispute over whether a limitation found in a dependent claim should be read into an independent claim, and that limitation is the only meaningful difference between the two claims." *Id.* (internal quotation marks omitted).

B. The "Preamble" Need Not Include the Specific Content Suggested by an Example in the Specification

Defendants would also require the preamble to include the specific content suggested as an example in the specification, defining the preamble to have "communication link control information" including "transmit rate bits, maximum receive rate bits, address bits . . . , and message format bits." '444 #2. Defendants draw this limitation from Figure 3B, which the specification describes as an "exemplar preamble." 9:36. In fact, the content of a preamble could vary in different embodiments, and, within an embodiment or implementation, from message to message. For example, the patent makes clear that address bits are added to the preamble only if there are multiple possible recipients (10:66-11:3), and this is supported by the description of the operation of the exemplary encoder (shown in Figure 8) (15:29-34). Additionally, because both the administrative header and the rest of the message cells are optional (6:52-54), so too is any corresponding message format information (15:42-46). It necessarily follows that, contrary to Defendants' construction, the preamble need not always (or only) include the four types of control data included in Figure 3B. *See* note 4, *supra*.

Defendants also argue that, if the preamble did not take their proposed form, "it would be impossible to know where the preamble ends and the optional administrative header begins when encoding." Def. Br. 25. This argument wrongly assumes that the encoding system would not

know what goes into the preamble. It would, and it would encode the preamble accordingly. More generally, the patent's description of a range of information that the "optional" administrative header may include in no way limits the contents of the preamble that accompanies "all communication messages" (6:31-33).

C. The "Maximum Rate Capable of Being Supported over a Communication Channel" Is Not Specified in Any Preamble

Claims in the '444 patent require that the preamble symbol be encoded at a lower bit-per-symbol rate "relative to the maximum rate capable of being supported over a communication channel." Defendants would require the "maximum rate" to be " 'the maximum receive rate' specified in the preamble it just received." Def. Br. 26. This limitation, which Defendants graft onto claim terms #5 through #9, confuses a *modem's* capacity to receive data with the *communication channel's* capacity to transmit data. If a preamble contains any "receive rate" bits, those bits represent "the rate (. . . in bits per symbol) that the [sending] receiver is capable of receiving." 9:41-43; *see* 10:57-60. The "receive rate" in a preamble just received (if specified) thus defines a capability of the transmitting device, not the communication channel. *E.g.*, 10:59-65. But the fact that a particular modem specifies (in a preamble or elsewhere) a particular receive rate that it is capable of handling says nothing about the ability of the communication channel to support transmission. And claims in the '444 patent require only that the preamble be encoded at a lower bit-per-symbol rate than the *channel* is capable of supporting.

D. The "Means for Applying a Preamble" Need Not Include Defendants' Improper Construction of "Communication Link Control Information"

Defendants' construction of the "means for applying a preamble to a communication message" is a back-door attempt to insert their proposed limitations on "communication link control information." The two structures necessary to perform the function ("applying a preamble to a communication message") are a sequencer (236) and a multiplexer (224). *See*

R153-54 ¶¶ 50-51. The additional elements identified by Defendants (201, 202, 204, and 206) are involved in the *creation* of the preamble; they are unnecessary to perform the function of *applying* the preamble to the communication message and are proposed only because they incorporate the limitations that Defendants have sought to read into "communication link control information."

IV. THE '858 PATENT

The '858 invention provides a way for communications equipment to share a common link (known as a "bus") in order for the equipment to access a network. The shared link takes the form of a time-division multiplexed ("TDM") bus, with each of the communications devices having access to the bus according to a TDM approach. The various communications devices may be sources of "**packet data**" – which the '858 patent, contrary to Defendants' contention (at 23), expressly defines as "variable-bit-rate data" (1:9-10). The patent thus provides a way for "multiple packet data sources [to] share a single TDM channel" (2:45-46), which, among other things, attempts to achieve "maximum efficiency" in use of the "TDM bandwidth" (3:6-8).

A. Defendants Wrongly Seek To Limit the Patent's Terms to a Single Device

The '858 patent describes a data communications system "architecture" (1:56) known as a "network access unit" (or "NAU"), through which the invention creates the efficiency and other benefits described in the patent. Although the patent never suggests that this architecture must be in one "device," Defendants propose that the term "**data communications apparatus**" be construed to impose just such a limitation. *See, e.g.*, Def. Br. 20.

That argument should be rejected. The patent's first claim specifies that the "**[d]ata communications apparatus**" is "compris[ed]" of various elements, which are then enumerated. 11:38-48. Those specified elements disclose all the necessary content. Moreover, the '858

patent enables improved data communications among sources of packet data sharing a common communication channel. It makes no difference to that purpose whether all the data sources are within some enclosure such that the entire system may be called a unitary "device."

Defendants' position is also inconsistent with the understanding of the PTO and the Patent Examiner. During prosecution, the Examiner initially equated some of the '858 patent's claims to a prior patent's "medium links" that connect "nodes of a communication network."[13] The Examiner thus indicated that the invention was the same as prior art that involved connections between network facilities, *not* within a single device.[14] (The '858 patent was ultimately granted on the basis that the prior art did not involve the "distributed packet manager" disclosed in the '858 patent. F001061.) Finally, the use of *dashed* lines at the periphery of the '858 patent drawings (such as Figure 3) supports Rembrandt's understanding, as that usage is consistent with the recognized convention of showing a collection of elements (not a single device) in patents.

Defendants similarly err (at 20) in seeking to limit the term "**bus**" to hardware lines *within* a device. In fact, a line connecting *separate* components in a computer network have been known as a bus since before the filing of the '858 application. For instance, a Universal Serial *Bus* (or "USB") that connects personal computers or other devices to other equipment, such as printers, does not connect components *inside* a single device. Indeed, Defendants' own patents use the term "bus" with Rembrandt's meaning, not their own. Typical is Motorola's statement: "Computers and computer peripheral devices, such as printers, modems and disk

[13] "The nodes are connected through medium links (TDM bus) . . . ." F001036 (citing U.S. Patent No. 4,763,321(R303-325)).

[14] U.S. Patent No. 5,463,624 (R351-378), 1:18-21 (Hogg et al.).

drives, are typically networked together allowing communication between the host computer and peripherals *via the electrical bus*."[15]

Defendants stress that the preferred embodiment sends signals over "internal buses." Def. Br. 20. But the preferred embodiment does not say that the bus needs to be internal, nor would there be any reason for it to do so. The word "internal" is not used in the specification.

In the same vein, Defendants err (at 20) in seeking to limit the "**data sources**" in the architecture to "circuit boards inside the apparatus" ('858 #17, #18, #19), based solely on an "example" mentioned in the specification (7:47-48). That an example involves one architecture provides no basis to limit the invention to that example. *See* note 4, *supra*.

B. The Court Should Reject Defendants' Additional Extraneous Limitations

Defendants further assert that a TDM bus can only support one data source in an *interval of time.* But the example in Figure 5 (on which Defendants rely) demonstrates that this assertion is incorrect. That figure shows a packet denoted 50 beginning near the end of *an interval of time* – at bit 7 of time slot 4 (packet data may begin (and end) anywhere in a time slot (5:63)). Thus, one or more other sources could transmit data in that *same interval of time* (time slot 4), using bits 1 through 6. Similarly, packet 50 ends near the middle of another *interval of time* – at bit 3 in time slot 2. Other sources could transmit data in that same interval (time slot 2) using bits 5-8.

Defendants also suggest (at 22) that a "**portion**" *must* be a "fixed amount less than the whole." "Portion" is a common word that requires no construction. In any event, there is nothing in the word "portion" (or its use in the '858 patent) that suggests that the "portion" must be "fixed." The word "fixed" is used in the specification to refer to the *whole*, not the portion.

[15] U.S. Patent No. 5,382,841 (R346-350), 1:10-16 (emphasis added); *see* U.S. Patent Nos. 4,688,166 (to Motorola Computer Systems, Inc.) (R253-291), Fig. 1 & 4:22-36; 5,029,284 (R341-345), 1:12-20; 5,504,413 (R379-383), Fig. 1 & 3:2-15; 5,751,978 (R384-396), 1:10-17.

6:34 ("a fixed network pipe"). Defendants cite to a use of "fixed" to refer to the portion (Def. Br. 22 (citing 1:67-2:1)), but that use is in the *background* portion of the patent describing problems with *prior art approaches*. Additionally, in common language, one can give out a "full portion," which in fact would be the whole ("I give the full portion to Sarah, leaving nothing for William."), and there is no reason to preclude that reading of this common term here, particularly where, as in claim 1, the claims do not require the bandwidth of the bus to be divided into any second communication channel.

Finally, the '858 patent states that "no central packet manager [CPM] is required to aggregate the packet data" or "to synchronize packet data to the TDM bus." 2:46-48; 3:4-6. Contrary to Defendants' argument (at 18), the '858 patent does not preclude *any* use of a central packet manager for other purposes, and no such restriction should be added.

V. THE '819 PATENT

The '819 patent describes a system in which a number of remote units (or "drops") communicate with a master unit in a "multidrop configuration." Each of the remote units executes at least one application program.[16] These application programs may need to communicate with the master unit (to send and/or receive data to/from the master unit). Because the remote units share the communications channel to the master unit,[17] some form of controlled channel sharing is required. The '819 patent uses a TDM approach to inbound channel sharing, dividing the communications channel (based on time) among the application programs running on the remote units.

[16] Claim 1 requires that at least one remote unit executes at least two application programs.

[17] The channel direction from the remotes to the master unit is sometimes referred to as the "inbound" or "upstream" direction. The direction from the master to the remotes is referred to as the "outbound" or "downstream" direction.

TDM assumes that all entities (master and remotes) are running on synchronized clocks. However, because exact clock synchronization is impossible, an actual TDM system must provide for some amount of so-called "guard time" between messages. *See*, *e.g.*, Fig. 5; 2:10-17. The inventors realized that, by taking into account the latency (or delay) between the master unit and each remote unit, they could reduce this wasted guard time, and thereby increase the efficiency of the system. To this end, the inventors use "ranging" (during initialization (5:25-27) and periodically repeated (6:32-36; 3:25-29)) to measure round-trip transmission or delay times between the master unit and the remote units. 2:10-13. The invention thus reduces the amount of wasted time between allocated time periods.

A. "Application Programs" Are Programs or Processes That Can Be Run on a Remote Communication Device, Such As a Modem

An "**application program**" under the '819 patent is simply a program that can be run on a remote communication device, such as a modem. That reading is consistent with the claims of the patent, which recite application programs specifically in terms of being run on a remote unit: "each of said remote units execute at least one application program." 7:31-32. It is also consistent with the prosecution history, which shows that the previously used phrase "host application" was changed to "application program," clarifying that the program in question no longer needed to be running at a central host. After this change, the Examiner stated that the prior art "fails to disclose the execution of application program [sic] by each of the remote units." F001468.

In conflict with this clear patent language and prosecution history, Defendants seek to define an "application program" as one that "directly meets the needs of a user." '819 #4. That limitation does not come from the claim language, or even from the specification. It is simply made up out of whole cloth. In addition, Defendants' construction is inherently vague. All

programs "meet[] the needs of" someone, or they would not be used. And suggesting that a program must meet those needs "directly" merely adds further ambiguity. Defendants' constructions render the claims indefinite, exactly what *Markman* seeks to avoid. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 986 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996).

B. A "Master Unit" Does Not Have To Send Messages Without Packet Headers or Delimiters

Defendants argue that the term "**master unit**" requires the understanding that the device is "installed in a network that sends messages to its remote units using time-division multiplexing *without packet headers or delimiters*." Def. Br. 12 (emphasis added; internal quotation marks omitted). A "master unit" simply distinguishes that unit from the "remote units," and so requires no construction. In any event, there is no reason to read Defendants' proposed limitations into the general language of a "master unit." Indeed, the specification does not mention "packet headers or delimiters."

Defendants rely on the distinguishing of the Krum patent[18] in the prosecution history, but they misconstrue that history. One difference between the patents is that Krum does not use TDM. Instead, Krum's master unit sends out messages to the various remote sites on an *as-needed* basis. *See* Krum, 8:24-45. In the '819 invention, on the other hand, outbound messages are time-division multiplexed (6:27-29), so each remote unit can know (based solely on the time) where the message boundaries lie. In explaining these distinctions, the applicant did *not* say that all messages in the '819 patent are sent without packet headers or delimiters. What the applicant did say, among other things, was that "the instant claimed invention *is time division multiplexed*

[18] U.S. Patent No. 4,726,017 (R292-302) ("Krum").

without packet headers and delimiters." F001461 (emphasis added).[19] In other words, TDM in the present invention is implemented without using packet headers or delimiters *to mark the time boundaries and message recipients.* The fact that the one task of TDM is implemented without headers or delimiters does not mean that headers or delimiters can *never* be used. This history thus neither supports Defendants' construction of "master unit" nor bolsters their attempt to import that limitation ('819 #2, #3, #8) into other terms, including the phrase "master unit."

C. Remote Units Need Not Transmit Only in Response to Polls

Defendants assert that the phrase "**communicating with said master unit in a multidrop configuration**" requires that "all inbound transmissions to the master unit contain responses to outbound polls to remote units." Def. Br. 12. But, because not all inbound messages are in response to polls, not all inbound messages need to (or can) include responses to outbound polls. Although the '819 patent uses outbound polls as part of its ranging process (Fig. 6), there is no reason to read this claim to require that *all* communication to the master unit "contain responses to outbound polls." To the contrary, the '819 patent uses "transmit inhibit" and "transmit enable" bits from the master unit to the remotes to deal with slot reservations. 3:63-64. If remote units only responded to polls from the master, there would be no need for the master unit to send a "transmit inhibit" message to a remote to tell it not to send information. Additionally, claims 1, 2, 11, 12, and 14 do not refer to or require polled protocols, while dependent claims 3 and 15 recite networks using "polled protocols."

[19] More generally, the applicant noted that Krum did not include "a master network timing means with a period which is divided into a plurality of subframes, wherein each subframe is divided into said time slots, *and each of said time slots is used as an interval in which one of said application programs in said one of said remote units is assigned to transmit to said master unit in a time division multiple access fashion*," and that Krum did not disclose the "ranging" feature that the '819 system disclosed and claimed. F001461 (emphasis added; internal quotation marks omitted)

D. Time Slot Assignments Are Not Fixed Forever During "Initialization"

Defendants assert that no time slots are reassigned during "normal operation." This is counter to the teaching of the patent, which, as described in Figure 8, shows an "assignment of transmission period for reservation requests" during "normal operation." Without changing the assignment of time slots (during "normal operation"), there would be no way to satisfy reservation requests from applications for more time.

Defendants similarly err in asserting that priority does not apply to a particular message. The '819 patent teaches that each typical time slot in a "**subframe**"[20] can include "**priority bits**." Fig. 5; 4:62-66.[21] Each time slot is initially assigned to an application executing on a remote unit. If, as Defendants would have it, the priority was always associated with the remote unit and fixed at initialization (by the master unit), then there would be no need to communicate the priority bits *to* the master unit on a subframe-by-subframe basis (*i.e.*, application-by-application basis). The master unit would know these initial priority values from its initialization.[22]

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[20] Defendants' proposed construction of "**subframe**" contains many extraneous limitations (indicated in italics): "division of a frame *that contains a fixed number of time slots that must begin and end within the frame, assigned by a user to a single remote unit*." '819 #12. These limitations are not necessary to understand the term and are not based on the claim language. They are not even accurately taken from the specification. Nothing requires that the division be "fixed" or "assigned by a user."

[21] The '819 patent uses the term "priority bit" to refer to "[a] bit used to convey the relative importance of the communication." '819 #20. Defendants would load the term with numerous limitations (indicated in italics): "a bit defining a *remote unit's* relative importance *as compared to subsequent units, set by the user at initialization of the master unit*." *Id.* Defendants' entire argument in support is: "**Priority bit** [1N] is a bit 'defin[ing] the remote's relative importance' as 'compare[d]' to 'subsequent units,' input by the user at master initialization. (7:2-3; 2:21-23; 3:1-4.)" Def. Br. 17 (alterations in original). This argument selects words from *three different columns* of the specification to suggest limitations not present in the specification, let alone required by the claims.

[22] Defendants also ask (at 16) for a complex construction of "**reservation request bit**" when it is sufficiently defined by the claim language, which reads: "a reservation request bit for requesting an additional time interval." 7:54-55 (claim 2).

E. Ranging Can Be Performed at Any Time and for Any Remote

The phrase "**ranging means**" should be construed according to its ordinary meaning, as set forth in the '819 patent specification. The specification defines "ranging" as a "calculation of the time a signal takes to go from the master unit to any remote unit and vice versa." 3:66-68.

Defendants again attempt to add an unwarranted limitation. Defendants' construction requires that the ranging occur only "during an initial training period." Def. Br. 15 (internal quotation marks omitted). The specification, however, expressly contemplates ranging *after* initialization during normal operation, and thus refutes Defendants' argument. *See* 3:25-29 ("The master unit **10** also provides, in addition to primary traffic flow over the channel outbound to remote units, a diagnostic channel which can be inband, and any control information necessary to update clock drifts, *perform new ranging*, etc.") (emphasis added); 6:32-35 ("The master unit *periodically* transmits a network clock reading to all remotes and performs a roundtrip delay transmission calculation ('ranging') to each remote unit.") (emphasis added).

Defendants wrongly claim (at 15) that "ranging means" is a means-plus-function term. But courts only presume means-plus-function analysis applies "[i]f the word 'means' appears in a claim element *in association with a function*." *Micro Chem.*, 194 F.3d at 1257 (emphasis added). That is not the case here, where the patent does not recite a function for this term:

> ranging means communicating with said master network timing means wherein a transmission time between said master unit and each of said respective remote units is calculated and transmitted from said master unit to each of said respective remote units, each of said respective remote units using said transmission time to adjust initiation of said time slots.

7:44-51 (claim 1). By contrast, when the patent claims a means-plus-function element, it uses "means *for*" language. *See* 8:31 (claim 12) ("means for calculating clock drifts"). There is no use of the word "for" in the above language. Defendants' argument as to "**master network timing means**" suffers from the same flaw.

VI. THE '903 PATENT

Communication systems (e.g., telephones, modems, and the like)[23] can suffer from signal degradation due to so-called "noise." Noise results from many factors, including interference from other signals and the physical nature and quality of transmission lines. When two modems communicate over a cable, the physical nature of the cable can introduce and/or worsen noise in the signal. When one of the modems receives a signal, that signal will generally include both the intended signal *and* some noise. Clearly, it is preferable to have more of what is received be actual signal and less be noise, *i.e.*, to increase the ratio of signal to noise.

The '903 patent describes and teaches a way to increase the signal-to-noise ratio ("SNR") in communication between two modems. The inventors realized that, if they could compare what was actually sent by a transmitting modem to what was received by another modem, they could ascertain what noise had been introduced by the transmission system. That knowledge – *i.e.*, what noise was introduced – could then be used to adjust the signal being sent in a manner that would counteract the noise. The inventors recognized that some of the noise introduced into modem systems related to the frequencies at which the transmitting modem sent its signals, and that by emphasizing the magnitude of the transmitted signal at frequencies with greater noise, or otherwise adjusting its frequency-dependent aspects, they could reduce the relative effect of noise and consequently and desirably increase the SNR.

The '903 patent describes an adjustable "pre-filter" (Fig. 5, element 16) in the transmitting modem. Pre-filter 16 "parameterizes" adjustments to improve signal-to-noise ratio (*i.e.*, the adjustments are made by appropriately setting the values of various parameters). Fig. 6; 4:35-43. The pre-filter adjusts the output signal sent from the transmitting modem, based on

[23] *See* 1:48-49 ("telephone *and other communications line* applications") (emphasis provided); Title (and throughout description) ("Digital Modem").

noise received by the receiving modem. More specifically, the pre-filter adjusts the output signal based on the values of parameters relating to noise received by the receiving modem. In a preferred embodiment of the invention, the example shown in Figure 5, pre-filter 16 adjusts the transmitting modem's output signal by adjusting parameters (coefficients denoted C_i in Figure 5 – the C_i being based on the noise signal values – *i.e.*, on the so-called "noise spectrum"). Fig. 5; 3:51-53. In this embodiment, the output signals are adjusted by parameterized pre-filter 16 and are then converted to analog form for transmission over communications line 20. 3:55-57.

The '903 patent describes how the receiving modem analyzes the signal it receives to try to determine what part of that signal is actual signal and what part is noise: First, certain noise signal values of the received signal are generated. *E.g.*, Fig. 5 (block 24); Fig. 4. Then this noise spectrum is transformed in various ways in order to determine the parameters (coefficients C_i) that are used by the pre-filter in the transmitting modem. The '903 patent teaches how the noise spectrum is first converted from one format to another (from log scale to linear scale, 4:66-68) and is then converted (and combined in various ways) to get the filter coefficients C_i. 5:1-12. Finally, these values based on the noise signal (C_i parameters) are adjusted in various ways specific to the pre-filter and are then provided (as C_i') to the pre-filter. 5:13-23.

The '903 patent illustrates one of several different ways to determine a noise spectrum. Fig. 5 (block 24); Fig. 4; 3:11-46. In the illustrative circuit shown in Figure 4, a noise spectrum (in the time domain[24]) is generated by circuit 50, and that noise spectrum is then converted (by the complex Discrete Fourier Transform ("DFT")[25] 68) to a frequency-domain representation of the same noise spectrum. 3:42-46.

[24] Reference to the time domain means that the amplitude (magnitude) of noise is plotted against time. In the frequency domain, the amplitude of noise is plotted against frequency.

[25] A Discrete Fourier Transform is a well-known way of converting a sequence of amplitude values in the time domain to the corresponding sequence of values in the frequency domain.

A. Noise Spectrum/Parameters from a Frequency Domain Plot of Noise Signals

Noise spectrum: Defendants propose limiting the definition of the term "noise spectrum" to a "frequency domain plot of the noise signals across a range of frequencies." '903 # 4. Their proposed construction ignores both the common meaning of the term (which does not tie it to any particular representation or domain or to any range of frequencies) and the teaching of the '903 patent. The '903 patent illustrates one way to determine a noise spectrum. Fig. 5 (block 24); Fig. 4; 3:11-46. In the circuit shown in Figure 4, circuit 50 generates a noise spectrum in the time domain. That noise spectrum is then converted (by the complex DFT 68) to a frequency-domain representation of the same noise spectrum. 3:42-46.

There is no requirement here that frequencies be captured or determined in any particular domain, let alone in the frequency domain. Changing the representation of a set of noise signal values from one domain to another is merely that – a change in representation. The input to the DFT 68 is a noise spectrum, as is its output, albeit in different domains. A person of ordinary skill in the art at the time of the invention would have recognized that there were different ways to capture the noise spectrum, including capturing it in any of several domains and converting it into any of a variety of other domains (as is shown in the circuit of Figure 4). Accordingly, "noise spectrum" should be defined simply as its plain meaning: "noise signal values."

Generating parameters responsive to said noise spectrum: Here, again, Defendants chose a particular point in the process at which some parameter values are determined and then propose restricting the claims to that point. As explained above, the noise spectrum is used to determine the parameters (coefficients) to be used by pre-filter 16. These coefficients derive from a set of parameters, the computation of which is explained above. The parameters are "based upon the noise signal at given frequencies," '903 # 7, as Rembrandt proposes.

Defendants' proposed constructions ("generating parameters by *choosing* points of a

noise spectrum of said output," '903 # 5, or "generated parameters *chosen* as points of a noise spectrum of said output," '903 # 7, proposed for claim 21) ignore the various different other available conversions and transformations that the '903 patent specifically teaches may be applied to the noise signal to determine parameters. Defendants' proposed constructions also ignore the possible different representations of the noise spectrum disclosed in the '903 patent, and they attempt to impose these restrictions based on only a particular embodiment from the specification, contrary to governing Federal Circuit precedent. *See* note 4, *supra*.

Even if the Court were to adopt Defendants' construction of "noise spectrum," their proposed construction of the "generating parameters" phrase by "choosing points" is unjustifiably restrictive and ignores all the various other calculations and transformations taught by the '903 patent. The proper definition of this term is its literal meaning – generating parameters on the basis of ("based on") a noise spectrum of the output.

B. Adjusting Frequency-Dependent Characteristics

Adjusting frequency-dependent characteristics: Claim 1 recites "means responsive to the pre-emphasis coefficients for adjusting frequency-dependent characteristics of an output of said first transmitting means." The pre-filter 16 shown in Figure 5 performs this function. Defendants proposed construction adds all sorts of unneeded and unwarranted additional restrictions to those already stated in the claim. Their argument is that the structure corresponding to the "means" should be limited to something that would satisfy a theoretical *goal* of the invention (that the SNR "remains constant"). There is no legal support for adding to the function described in the claim itself further limitations based on the "goal" of the invention. To the contrary, the function of this means-plus-function clause is "adjusting frequency-dependent characteristics of an output of said first transmitting means," because that is what the

claim says the function is.[26]

C. "Means" Including Structures Necessary To Perform Their Functions

Defendants' proposed "means-plus-function" constructions have one thing in common: they all include unnecessary, unjustifiable structure. Typical of these claim misconstructions is that for the "computing means" in which Defendants require, *inter alia*, inclusion of a "multiplier **30** that divides the output of the comparator." '903 # 15. This flies in the face of the clear teaching of the '903 patent that the multiplier is optional. 4:23-27. In fact, the '903 patent makes quite clear that various aspects of the invention are optional and may be performed in both or either modem. *See* 4:18-21 ("This division is done as the current state-of-the-art is to have the transmitter provide by pre-emphasis one half of the signal compensation required while the receiver provides the other half."). Thus, the proper structure is simply: compute block 48 and operating code that performs the steps of computing the pre-emphasis coefficients from the parameters, or the equivalents – per Figure 4 (compute block 48); 4:66-5:17.

Defendants assert that: "Rembrandt agrees that **generating means** . . . , pursuant to § 112, ¶ 6, is 'noise spectrum generator circuit **50**,' which must necessarily 'include the complex DFT block **68**.' " Def. Br. 30. Rembrandt does *not* agree and this is *not* Rembrandt's proposed construction.[27] The DFT circuit takes a noise spectrum (in the time domain) of the output and generates a representation of that noise spectrum (in the frequency domain) from which

[26] *ACTV, Inc. v. Walt Disney Co.*, 346 F.3d 1082, 1087 (Fed. Cir. 2003) ("When identifying the claimed function, this court has noted that § 112, ¶ 6 'does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim.' ") (quoting *Generation II Orthotics Inc. v. Medical Tech. Inc.*, 263 F.3d 1356, 1363 (Fed. Cir. 2001)); *Micro Chem.*, 194 F.3d at 1258 ("The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim."): *Creo Prods., Inc. v. Presstek, Inc.*, 305 F.3d 1337, 1346 (Fed. Cir. 2002).

[27] It is not clear from Defendants' brief who or what is supposedly being quoted, but it appears that Defendants are quoting their own brief and implying attribution to others. Defendants are *not* quoting Rembrandt.

parameters may be determined. The noise spectrum generator circuit 50 is not what is needed to generate parameters and should not be held to be required structure of the "generating means." The generating means is simply: noise spectrum generator circuitry, or the equivalent – per Figure 4 (element 50) and Figure 5 (element 24).

VII. THE '159 PATENT

The invention of the '159 patent provides the ability to update all programs within a device (such as a modem) remotely, without being vulnerable to loss of power. As described in the specification, one preferred embodiment of the invention involves downloading and installing a new set of programs in the system's program memory by first downloading and installing a new set of "essential programs" (an "EP set") – using some portion of the memory not containing the old EP set – and then transferring control to the new EP set by using an "offset address." 4:27-34. The remainder of the programs can then be downloaded and installed into the program memory, including by optionally overwriting the old EP set. 4:35-36. However, there is no reason why, after the new programs are downloaded and stored, the memory cannot contain both new and old programs (or parts thereof). As long as the modem knows which programs it is supposed to run, any number of versions of the programs can be stored in memory.[28] The invention is not limited to this embodiment, and, in particular, the claims do not refer at all to the EP set, but instead describe a system for updating programs more generally.

The '159 patent describes systems supporting software updates (and the '234 patent, discussed immediately below, describes methods for performing software updates). The patents are *not* concerned with and do not describe or limit the manner (or place) in which, or the time at which,

[28] The claims of the '234 patent teach overwriting parts of the old version of the program, but that limitation is not part of the '159 patent.

any programs – once stored and updated – are executed. Defendants' pervasive efforts to restrict the scope of the patents by importing limitations related to program execution should be rejected.

Defendants also err in stating that the "offset" address is the same as the start address of the new EP set. *See* Def. Br. 32. The *start address* is an address in memory where the "programs are **initiated**" (the "boot" or initialization address). Abstract; 2:4-8; 5:18-19; 5:41-42; 6:56-57. The *offset address*, by contrast, is used *during the download* process to transfer control from the old download program (in the old EP) to the new download program (in the new EP). 4:4-5; 4:33-34.

Defendants propose numerous constructions for terms in the '159 patent (and for the related '234 patent) that need no construction – for example, the phrase "said memory being non-volatile and capable of being completely updated in its entirety" is straightforward enough to require no construction. '159 #3. Yet Defendants would construe this and several other phrases as "the system enables all contents in the system's non-volatile memory to be erased and overwritten during an update operation." '159 #1, #2, #3, #4. This construction is wrong in subtle ways; even if it were not, it injects confusion into the patent with indefinite concepts such as "system" and "enables" and "update operation." Defendants propose many similarly unnecessary constructions containing limitations that are extraneous, indefinite, and confusing – and wrong for reasons given in Rembrandt's opening brief. The Court should reject such unsupported proposals and instead adopt Rembrandt's constructions, which track the claim language. *See also* '159 #6, #7, #8, #9, #10, #11, #20; '234 #11, #13, #14, #16.

A. The Independent Claims of the '159 Patent Do Not Include the EP Set

The specification describes the "EP set" by reference to the prior art – that is, as "a program portion in the local equipment that is resident in a read-only memory, and its contents

are not changed." 1:49-51; *see* 1:56 ("This set of programs is the 'essential programs' (EP) set."). While this set is said to "contain[ ] 'boot-up' segments and program segments that are necessary to maintain communication" (1:52-53), its contents are not so limited. By contrast, claims 1 and 6 refer to "a set of programs . . . that are executed when the system needs to be **initialized**" 5:10-12; 5:37-39. Arguably, this refers to the "boot-up" segments mentioned in the specification, though it need not. Claim 8 refers to "a program module . . . that, when activated by said processor, effects communication with said port." 5:53-55. Here, this may (or may not) refer to the elements of the EP set related to communications, but does not refer to other programs in the EP set. Claim 10 refers to "a set of programs that are executed when the system needs to be initialized and a program for controlling communication" (6:14-16), but not to other possible elements in the EP set – which might include, for example, "a set of program means . . . that are activated when said system needs to be updated with a new set of programs" (6:51-53) – the *only* set referred to in claim 18 (which does not refer to initialization or communication). Indeed, what is contained in the EP set of a particular device is not relevant to the claimed invention, which is why the patent contains no mention of it, and instead refers to demonstrably different programs and program sets in various claims. There is no basis for reading any limitation into the self-explanatory references in the claims.

B. The Set of Programs Stored in the Non-Volatile Memory Need Not Be "Executed from" Non-Volatile Memory

As we have explained, *see* Rembrandt Br. 37, there is no requirement that *any* program be "executed from" non-volatile memory. The '159 patent teaches a system for updating programs stored in non-volatile memory; what matters for purposes of the invention is (1) that certain updated programs are stored without vulnerability to power loss and (2) that the system knows where the active program is stored in program memory. Other operations of the device,

including the manner in which (or the place from which or time at which) it executes any program, are "irrelevant." 2:67. They cannot be the basis for an extraneous claim limitation.[29]

There is no support for Defendants' construction in the language of the claims, which specify where programs are "stored" (claims 1, 6, 18) or located (claim 8 ("in said memory"); claim 10 ("memory containing programs")) and their function (*e.g.*, claims 1, 6: programs that "are executed when the system needs to be initialized"). The claims do not describe the manner in which the programs are executed. Claims 1 and 6 refer to programs "**stored** in . . . memory" and describe them as "programs . . . that are executed when the system needs to be initialized" (5:10-12; 5:37-39) – a description that is consistent with execution "from" some other location. There is no support in the file history either: the italicized portion cited by Defendants describes capabilities of the system, not limitations on the invention.

C. "Alterable Storage Means" Does Not Require or Include the Bus Connections

Claims 1 and 18 of the patent teach "alterable storage means for holding a displacement multi-bit memory address . . . to point to the starting address accessed by the processor when initializing" (5:16-19 (claim 1)) and "an offset memory address . . . used to point to a starting address accessed by said processor when initializing" (6:54-56 (claim 18)); claim 6 teaches "alterable memory means for storing a multi-bit memory address that controls the starting address accessed by the processor when initializing" (5:40-42). The function of the structure is "holding a displacement multi-bit memory address"; what the stored address may be used for is

[29] Defendants fail even to explain what "executed from non-volatile memory" means. Programs are executed by a processor. A processor typically executes instructions from an instruction register, into which the instruction is loaded from some memory; the processor must also maintain the values of any variables in the running program. Whether the instructions are supplied to the instruction register directly from the program memory or whether there are intermediate locations (*e.g.*, read/write RAM) or steps (*e.g.*, decompression) is irrelevant to the claimed invention.

unrelated to the function of "storage means." Defendants disregard this distinction and then add further unfounded limitations (indicated by italics): "storing an *updateable* multiple bit address *that is added to a memory address supplied by the processor that changes the first nonvolatile memory location accessed by the processor when the system is powered on or re-booted*." '159 #12. It is worth noting some subtleties that are lost in the unnecessary translation by Defendants. For instance, Defendants change the word "alterable," modifying "storage means," to "updateable," now modifying "multiple bit address." Similarly, Defendants change "initializing" to "when the system is powered on or re-booted." These substitutions are not equivalent.

Defendants' construction of the structure is unsupportable: "updateable offset address register **40** connected to processor **10** and modifier circuit **30**." '159 #12. Defendants would include not only the means provided in the specification for storing the address in the register ("register **40**"),[30] but also everything that structure interacts with ("processor **10** and modifier circuit **30**"). A structure *must not* contain extraneous components that do not "actually perform the recited function." *Asyst Techs., Inc. v. Empak, Inc.*, 268 F.3d 1364, 1371 (Fed. Cir. 2001). The additional components Defendants identify do not perform the function of storing an address. They "merely enable the pertinent structure to operate as intended," *id.*, and so are not part of the structure. *See also* '159 #17 (proposing even more extraneous structure for similar function). Moreover, modifier circuit 30 is required by dependent claim 5 (which claims "translation means"); it would violate the principle of claim differentiation to read "translation means" into the "storage means" of the independent claim. *See Ecolab*, 285 F.3d at 1375.

[30] The '159 patent states that "register **40** can [be] manufactured together with memory **20** and be an EEPROM . . . [or] . . . register **40** [may be] constructed as part of the read/write memory or as part of processor **10**." 4:40-44.

Defendants argue that the "offset is added by 'address modifier **30**' to a memory address supplied by 'processor **12**,' when the device is powered on, in order to then point to the very first instruction in nonvolatile memory that the processor will execute." Def. Br. 36. However, Defendants confuse the initialization address with the address used during a software update to pass control from the old EP to the new EP (described at 4:4-14). The initialization (start) address can be stored anywhere and need not be modified.

D. Claims 8 and 10 of the '159 Patent Do Not Need Structure To Download Through a Communications Port

Defendants also misconstrue the functions and structures of two means-plus-function elements in the following claim language:

> means for [(A)] activating said program for controlling communication and [(B)] receiving information through said communication port to modify the programs in said memory, said information including the program for controlling communication through said communication port and a command that is executed by said processor effectively when it is received.

6:18-24 (claim 10). The function of the first means-plus-function element, even Defendants agree, is "activating said program for controlling communication . . . through said communication port." '159 #18. The function of the second means-plus-function element should be "receiving information through said communication port" – not the additional limitations Defendants propose that have nothing to do with the function.

Defendants' proposed structures for these functions, not surprisingly, include a breathtaking number of components. Tellingly, the proposed structures for both functions *are identical*.[31] Given how plainly different the functions of "activating" and "receiving" are, this reveals that Defendants are not tailoring proposed structures to fit the corresponding functions.

[31] Defendants propose the following structure for both terms #18 and #19: "processor **10** with port coupled to external communications line **12**, buses **13**, **14**, and **16**, offset register **40**,

In contrast, Rembrandt's proposed structures include the necessary components but not extraneous ones. For the function of "activating said program for controlling communication . . . through said communication port," the only structures necessary are a communication port and a processor programmed to perform the activation of the program. Rembrandt proposes the following structure: "Communication port and processor 10 programmed to perform the step of activating the program for controlling communication." '159 #18. The structure required for the function of "receiving information through said communication port" is more involved, including not only the communication port and a processor programmed to perform the step of receiving information, but also some memory to hold that information. Accordingly, Rembrandt proposes the following structure: "System including memory, communication port, and processor . . . programmed to perform the step of receiving information . . . ." '159 #19.

No further structure is needed to perform these functions. Nevertheless, Defendants include all sorts of structure that either does not exist in the specification or merely enables the pertinent structure to operate as intended. For instance, Defendants add components such as an "offset register" and "modifier circuit." Defendants also would require the memory to be "nonvolatile memory." This is inappropriate because, for achieving the functions of "activating" and "receiving," it makes no difference whether the memory retains its contents in the event of a power loss. To be sure, certain memory components of the preferred embodiment are non-volatile, and certain claims contain an express limitation requiring a memory element to be non-volatile. That does not, however, provide any reason to import that limitation into the structure for "activating" and "receiving." The Court should reject Defendants' efforts to do so.

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modifier circuit **30**, nonvolatile memory **20** containing an EP set of programs, and an algorithm for executing either the steps of Figure 2 or 3 out of nonvolatile memory **20**."

E. The System Need Not Update Its Entire Non-Volatile Memory During the Download

The '159 patent teaches a system including non-volatile memory with the *capability* of being updated in its entirety; there is nothing in the claims that supports any requirement that the system *must* be updated in its entirety during download. *See* claim 1 (memory "of a type which **may** be completely updated in its entirety"); claims 6 and 8 ("memory being completely **updatable**"); claim 10 (memory "**capable** of being completely updated in its entirety"); claim 18 ("memory . . . of a type, which is completely **updatable** in its entirety"). Defendants seek to change the plain language of the claims by suggesting that a particular embodiment provides for bulk erasure, even though other embodiments would not require (or even allow) bulk erasure – another case of Defendants seeking to import limitations from the specification into the claims. Defendants' construction finds no support from the file history, which emphasized the capability of updating the firmware in its entirety: it did not suggest that the invention required it.

VIII. THE '234 PATENT

The '234 patent is a divisional of the '159 patent. The '234 patent includes limitations that Defendants seek to import into the '159 patent. Most fundamentally, the '234 patent contains claim limitations related to the installation of the EP set, while the '159 patent (as discussed above) is not so limited. But the two patents cover distinct inventions, and it is not proper to read limitations from one into the other. *See* 35 U.S.C. § 121. Defendants' proposed construction of disputed terms in the '234 patent is incorrect.

A. Not All "Stored Program Controlled Apparatus . . . Memory" Need Be Non-Volatile

Defendants argue that the memory of claims 1 and 5 of the '234 patent is the only memory used by the programs stored therein. The specification is clear that the modems can include other memory, including "read/write data memory." 3:3-5. Almost any program

running on the modem (regardless of where it is stored) would use read/write memory during its execution. Non-volatile memory would not be used by any running program to store values for its variables. Most modem communication operations require buffering of incoming (and outgoing) data so that the data can be checked for errors and packaged in the correct form. This would apply as well to downloaded firmware. The memory where the new programs are ultimately stored is non-volatile, but that does not preclude other memory from being used to download or to execute the programs.

Claim 1 recites a "method for installing a new set of communication programs . . . into a . . . [modem] that includes . . . a memory." 5:26-28. The new programs are sent to the modem "with the aid of" existing programs already in the memory. 5:30-31. But the term "with the aid of" does not mean that those programs, when running, do not use other memory (*e.g.*, read/write RAM). Nor does "with the aid of" mean that those existing programs must all execute from the non-volatile memory. All that is required is that the new software is written into a part of the non-volatile memory that does not include the old EP set. This is a safety precaution in case the download fails or the new programs are faulty.

Similar arguments apply to claim 5.

B. P_{old} Need Not Execute from Non-Volatile Memory

In construing the claim terms "with the aid of a set of communications programs P_{old} already resident in said memory" (5:30-31), Defendants seek to add limitations that P_{old} "*execut[e] from the nonvolatile memory*" and that P_{new} be downloaded "for use in the same nonvolatile memory." Def. Br. 39 (emphasis added); *see* '234 #4, #8.[32] Again, Defendants

[32] Defendants propose (but do not defend) definitions for P_{old} and P_{new}, even though those symbols are defined in the claims (*i.e.*, as the "set of communications programs" "already resident in said memory" and the "new set of communication programs"). 5:26-31 (claim 1).

improperly attempt to add a limitation regarding the manner in which the software is executed. Further, Defendants ignore the fact that the claims are about *installing* software, not where the software that is installed may be "used." Indeed, a method in which P_{new} is downloaded for intermediate storage – which need not be in non-volatile memory – and then installed would be covered by the patented invention.

C. The Apparatus Need Not Stop Executing EP_{old} and Begin Executing EP_{new} "Immediately"

As we have explained, the '234 patent does not contain any immediacy requirement. *See* Rembrandt Br. 39-40; '234 #9; *see also* '234 #12 (adding "immediately" and "seamlessly" limitations), #15 (same). Defendants misleadingly place quotation marks around language that appears nowhere in the patent (they are quoting their own proposed construction!). Defendants likewise omit language from the specification (which, in any event, cannot properly be read to limit the claims), which makes clear that the offset address need not be immediately loaded into the register; until it is loaded, control would not be transferred to the new EP set.

D. EP_{new} Set Need Not Be Used in Installing the Remaining P_{new} Programs

Under the methods described in claims 1 and 5 of the '234 patent, the EP_{new} subset is installed, overwriting at least a portion of the P_{old} programs; the remaining programs in P_{new} are installed in other areas of the memory;[33] and the operation of the apparatus is altered to execute EP_{new}. But these steps need not be performed in any particular order, *see Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1345 (Fed. Cir. 2008) (holding that method steps could be

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Defendants should not be permitted to add limitations by re-defining those symbols. *See Phillips*, 415 F.3d at 1314 ("[T]he claims themselves provide substantial guidance as to the meaning of particular claim terms.").

[33] Under claim 5, this is accomplished by moving EP_{new} to a second area of memory after installation and then installing the remaining programs in the area of memory where EP_{new} was first installed.

performed in any order because claim language, specification, and prosecution history did not require any particular order); *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1342-43 (Fed. Cir. 2001) (when steps of method claim do not recite order of their performance, steps are not ordinarily construed to require particular order unless it is implicitly required that they be performed in order written); there is accordingly no reason that control could not be transferred to EP_{new} *after* the remaining programs in P_{new} are installed. Defendants' proposed construction ('234 #13) is unsupported.

IX. CONCLUSION

Rembrandt respectfully urges the Court to adopt its proposed constructions.

Dated: July 2, 2008

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CERTIFICATE OF SERVICE

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